

# Claims

I claim:

1. A multi-axial fixation device for use in aligning spinal members during operation, said device comprising:

a clamping block said clamping block defining a passageway, said passageway configured to receive a cross member therein, said clamping block having a clamping block connector connected thereto, said clamping block connector configured for connection with a first spinal member;

said cross member configured for insertion within said passageway, said cross member having a cross arm connector connected thereto, said cross arm connector configured to connect with a second spinal member, said cross member configured for variable locked positioning within said clamping block by a locking device;

said locking device configured to allow said cross member to be variously adjustably positioned and held within said clamping block;

said clamping block, said locking device and said cross member configured to allow variable positioning and locking of said cross member thereby allowing multiple adjustable positioning of said spinal members.

2. The multi-axial fixation device of claim 1 wherein said locking device comprises a plurality of stacked portions that are configured to lock and hold said cross member by compressive force upon said stacked portions.

3. The multi-axial fixation device of claim 1 wherein said passageway is a transverse multi-positional opening through said clamping block.

4. The multi-axial fixation device of claim 1 wherein said a cross arm connector and said clamping block connector are each configured to connect with a spinal member through the use of a pedicle screw.

5. The multi-axial fixation device of claim 1 wherein said cross member connector further comprises a safety stop; said safety stop configured to prevent withdrawal of said cross member from said passageway.

6. The multi-axial fixation device of claim 1 wherein said locking device is multiply adjustable through the use of a set screw.
7. The multi-axial fixation device of claim 6 wherein said clamping block further defines an aperture configured to maintain and hold said set screw within said clamping block.
8. The multi-axial fixation device of claim 1 wherein said clamping block is configured to have a flat surface with rounded edges to prevent discomfort that may be experienced by the recipient.
9. The multi-axial fixation device of claim 8 wherein said clamping block is configured to define at least one access opening said access opening configured to allow the passage of body fluids around said clamping block.
10. The multi-axial fixation device of claim 9 further comprising a retaining clip, said retaining clip configured to allow said locking device to be retained and removed from within said clamping block.
11. The multi-axial fixation device of claim 1 wherein said locking device comprises: a thrust cap, an upper portion and a lower portion, said thrust cap said upper portion and said lower portion each having a radius configured to interact with an adjoining portion when placed in a desired position and orientation, said upper portion and said lower portion each having a radius center and configured so that said radius centers are offset when said upper portion and said lower portion are placed in correct alignment within said clamping block.
12. The multi-axial fixation device of claim 11 wherein said cross member passes through said passageway and said locking device is configured to allow variable linear, rotational, and angular positioning of said cross member.
13. The multi-axial fixation device of claim 11 wherein said thrust cap is held in position by a retaining wire configured to retain said thrust cap from sliding out of said clamping block and preventing the whole system from disassembling when in a loosened state.

14. The multi-axial fixation device of claim 13 wherein said cross member further comprises a cross member safety stop, said cross member safety stop configured to prevent the cross member from disassembling, when said cross member is in a loosened state.
15. The fixation device of claim 1, wherein the angles and location of the cross member connector and the clamping block connector are configured for use in series and combination for use in multiple level fusions and bridging.
16. The fixation device of claim 1, wherein said locking device is configured for post operative access by a non-invasive means to accomplish a variety of post operative adjustments.
17. The fixation device of claim 16 wherein said device is configured to allow selective disengagement and adjustment of said spinal members in one direction while retaining said spinal members in a secured position in a second direction.
18. An improved method for posterior spinal fixation comprising:  
preparing the location for the embodied mechanism by removal of bone or unnecessary obstructions for the desired positioning;  
placing a fixation device in the prepared location and drilling the pilot holes for the pedicle screws within the alignment limitations of the fixation device using the holes in the connectors of the embodied mechanism as a guide for angles and placement, said fixation device having a clamping block said clamping block defining a passageway, said passageway configured to receive a cross member therein, said clamping block having a clamping block connector connected thereto, said clamping block connector configured for connection with a first spinal member, said cross member configured for insertion within said passageway, said cross member having a cross arm connector connected thereto, said cross arm connector configured to connect with a second spinal member, said cross member configured for variable locked positioning within said clamping block by a locking device, said locking device configured to allow said cross member to be variously adjustably positioned and held within said clamping block, said clamping block, said locking device and said cross member configured to allow variable positioning and locking of said cross member thereby allowing multiple adjustable positioning of said spinal members.  
affixing pedicle screws or anchoring device as presently used in the field to each side of the disk space to be bridged,  
attaching the embodied mechanism on the threaded pedicle screws with nuts;

aligning the spine across the affected disk space to be anatomically correct and tightening the set screw; and  
making adjustments postoperatively by a non-invasive procedure if necessary.